Claims

1. A virus removal bag for removing viruses from a virus-containing suspension, comprising:

a pouchy casing (a) having at least one inlet for a virus-containing suspension and at least one outlet for a virus-removed suspension; and

a separation membrane (b) which is securely held in said pouchy casing (a) and which partitions the internal space of said pouchy casing (a) into a first compartment (c) communicating with said inlet and a second compartment (d) communicating with said outlet,

wherein at least a part of said separation membrane (b) is made of a virus removal membrane for removing viruses from a virus-containing suspension by filtration to obtain a filtrate which is a virus -removed suspension, and

wherein said first compartment (c) serves to receive a virus-containing suspension introduced through said inlet, and said second compartment (d) serves to collect the filtrate obtained by filtering the virus -containing suspension through said virus removal membrane.

2. The virus removal bag according to claim 1,

wherein said separation membrane (b) is in the form of a membranous, overall surrounding wall of a filter bag,

wherein said filter bag is securely held in said pouchy casing (a), such that the membranous, overall surrounding wall of said filter bag partitions the internal space of said pouchy casing (a) into the first compartment (c) which is the internal space of said filter bag communicating with said inlet and the second compartment (d) which is the internal space of said pouchy casing (a), exclusive of a filter bag portion, communicating with said outlet, and

wherein at least a part of the surrounding wall of said filter bag is made of a virus removal membrane for removing viruses from the virus-containing suspension by filtration.

3. The virus removal bag according to claim 2, wherein said filter bag is tapered toward the forward end of the filter bag as viewed in a flow direction of the virus-containing suspension in said virus removal bag, wherein the tapering begins at the backward end of said filter bag or at a portion during the course toward the forward end of said filter bag.

4. The virus removal bag according to any one of

claims 1 to 3, wherein said virus removal membrane is a composite filter in which at least one prefilter and at least one virus removal filter are laminated in this order as viewed in a flow direction of the virus -containing suspension, to thereby form a composite filter, wherein, on at least one side of the composite filter, a nonwoven fabric is provided.

5. The virus removal bag according to any one of claims 1 to 4, wherein said virus removal membrane is a porous membrane having an average pore diameter in the range of from 1 to 100 nm.

6. The virus removal bag according to any one of claims 1 to 5, wherein said virus removal membrane is a hydrophilic porous membrane obtained by an addition of a hydrophilic compound onto the surface of a porous membrane.

7. The virus removal bag according to claim 6, wherein said addition of a hydrophilic compound is a graft polymerization reaction of a hydrophilic monomer.

8. The virus removal bag according to any one of claims 1 to 7, which is flexible.

9. The virus removal bag according to any one of claims 1 to 8, wherein said second compartment (d) has a volume sufficient to collect all of the filtrate obtained by filtering the virus-containing suspension through said virus removal membrane.

10. The virus removal bag according to any one of claims 1 to 9, wherein said first compartment (c) contains a spongy adsorber.

11. The virus removal bag according to any one of claims 1 to 10, wherein said second compartment (d) has a volume in the range of from 100 to 800 cm^3.

12. The virus removal bag according to any one of claims 1 to 11, which is aseptically and fluid-tightly connected to at least one functional bag which has a function other than a virus removal function, thereby providing a closed, multi-bag virus removal system.

13. A method for removing viruses from a virus -containing suspension, comprising:

(1) providing at least one virus removal bag of any one of claims 1 to 12;

(2) introducing a virus-containing suspension to said virus removal bag through said inlet, to receive said virus-containing suspension in said first compartment (c);

(3) filtering said virus-containing suspension through said virus removal membrane, to thereby remove viruses from said suspension;

(4) collecting a filtrate which is a virus -removed suspension in said second compartment (d); and

(5) withdrawing said virus-removed suspension through said outlet.

14. The method according to claim 13, wherein, in step (3), the filtration of said virus-containing suspension through said virus removal membrane is promoted by applying a centrifugal force to the virus-containing suspension in said first compartment (c).

15. The method according to claim 13, wherein, in step (3), the filtration of said virus-containing suspension through said virus removal membrane is promoted by applying a pressure to the virus-containing suspension in said first compartment (c).

16. The method according to any one of claims 13 to

15, wherein said virus-containing suspension is whole blood.

17. The method according to any one of claims 13 to 15, wherein said virus-containing suspension is plasma.

18. The method according to claim 17, wherein said plasma has never been frozen.

19. The method according to claim 17 or 18, wherein said plasma is leukocyte-removed plasma.

20. The method according to any one of claims 13 to 19, wherein, in step (4), all of the filtrate obtained by filtering the virus-containing suspension through said virus removal membrane is collected in said second compartment (d) before performing step (5).

21. A method for preparing a virus-removed plasma, comprising:

(1) providing a closed, virus removal system which comprises:

a plasma collector means (i) for collecting whole blood comprising plasma and blood cells and separating and collecting plasma from whole blood,

wherein said whole blood is suspected to contain viruses,

at least one virus removal bag (ii) of any one of claims 1 to 11, and

a plasma recovery means (iii) for recovering a virus-removed plasma,

said plasma collector means (i) being aseptically and fluid-tightly connected to said virus removal bag (ii), and said virus removal bag (ii) being aseptically and fluid-tightly connected to said plasma recovery means (iii);

(2) collecting whole blood from a donor into said plasma collector means (i);

(3) separating the collected whole blood into plasma and blood cells by centrifugation;

(4) introducing the separated plasma into said at least one virus removal bag (ii) from said plasma collector means (i), to receive said separated plasma in said first compartment (c) of said virus removal bag (ii);

(5) filtering said separated plasma through said virus removal membrane of said virus removal bag (ii), to thereby remove viruses from said separated plasma;

(6) collecting a filtrate which is a virus -removed plasma in said second compartment (d) of said

virus removal bag (ii); and

(7) discharging the virus-removed plasma from said virus removal bag (ii) into said plasma recovery means (iii).

22. The method according to claim 21, wherein, in step (6), all of the filtrate obtained by filtering said separated plasma is collected in said second compartment (d) of said virus removal bag (ii) before performing step (7).

23. Human or animal plasma obtained by the method of claim 21 or 22.